

A study on electronic payments and economic growth: Global evidences

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ABSTRACT

This study focuses on the relationship between economic growth and electronic payment systems based on a sample of countries from across the globe. The study is relevant considering the importance of payment systems in financial transactions and also because, being an evolving area, it is not much studied in literature. The study initially refers to the concept, types and other features of electronic payment systems and later on analyses the macroeconomic data from countries across the globe. No concrete evidence is found supporting or rejecting the relationship between electronic payment systems and economic growth which can be inferred as country specific issue.

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1. Introduction

The emergence of Information and Communication Technology (ICT) has drastically affected the lives and operations of individuals and organizations, respectively. ICT and Digital technologies have made great evolutionary development in finance, economics, operational costs (Slozko & Pello, 2015) and enhanced organizational performance. Offline and online business are two faces of a business in current times and online business is expected to grow in future. Electronic commerce is a necessity even for offline business as now most of the sales channels and marketing channels use online platforms. Schneider (2011) categorizes electronic commerce as business to consumer (B2C), business to business (B2B), consumer to consumer (C2C), peer to peer (P2P) and mobile commerce. The growth of e-commerce has created new financial needs and thus the electronic payment system has appeared which is quickly replacing a cash payment system. An electronic payment (e-payment), can be defined as paying for goods or services on the internet. It includes all financial operations using electronic devices, such as computers, smartphones or tablets. According to a report by *Mordor Intelligence*, the global digital payment market was valued at USD 3885 billion in 2019, and is expected to reach USD 8686 billion by 2025, with a CAGR of 13.7%, during the forecast period of (2020- 2025). Kowsalya et al. (2017) state that the trust in e-commerce depends on the online payment system and that the credit and debit cards will become obsolete, because of increasing development of telecommunications and mobile commerce. Tadse (2017) also found that digital wallets are quickly becoming mainstream mode of online payment and mobile users can use their mobile phones to make monetary transaction. They also found that Paytm (a mobile payment company) is performing well in terms of privacy but it has to work upon discounts/offers, transaction time and bring about innovation to increase customer satisfaction. The world payments system is gradually changing from physical money to electronic money (Premchand & Choudhry, 2015). The emergence of electronic payment systems is the

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next big thing in business. Several researches have highlighted its utility to economic growth (see Slozko & Pello, 2015; Oladeji, 2014). Although, there have been numerous studies in the past on various aspects of electronic commerce and online business (see Kaliannan & Awang, 2010; Hussein et al., 2010), there are very few studies available which are focussed on payment systems/payments framework and its interrelationship with economic growth. There is a paucity of literature on the subject and this study aims to address this gap. The objective of this study is to focus on electronic payments, understand more about it, discusses various aspects of it and analyses the relevant economic data from across the globe.

1.1 History of electronic payments

The electronic payments technology and infrastructure has evolved over the period of time. It is based on the evolution of currency with a new electronic currency system. The earliest form of a payment system is the ancient barter system where transactions were settled with delivery/exchange of things in kind. Then came precious metals/metallic coins as medium of exchange which resulted in Gold standard-based currency in the early 20th century. Subsequently the world saw the emergence of paper currency where each independent country/region had her own different currency. With the emergence of telegraph and Morse code in 1850s, telephone (Graham Bell, 1875) and the world wide web in 1990s, the payment systems were further developed. One of the foremost examples of electronic payment can be referred to the year 1918, when the Federal Reserve Bank of the United States (US) first moved the currency with the aid of telegraph. Subsequently, Automated Clearing House (ACH) was incorporated in 1972 in US which enabled U.S commercial banks and its central treasury with an alternative to cheque payment. First of the card payments can be traced to 1914 in Europe where traders and hotels started to issue prepaid and credit cards to their customers. The digitization of cards became prominent only in 1990s with the advent of World Wide Web and personal computers. Debit and credit cards are now used in transactions payments for all types of purchases and services across the globe (Mohamad et al., 2009). Few examples of electronic financial product and services are electronic cheques, e-cash, credit cards and electronic fund transfers (Ken & Will, 2002). A Unified Payments Interface (UPI) is a modern-day innovation in the banking system that powers multiple bank accounts into a single mobile application (of any participating bank) and merging several banking features. An electronic purse (E-wallet) is another modern-day innovation in financial products. The National Payments Corporation of India (NPCI) defines E-wallet as the digital version of the physical wallet with more functionality. Some examples of E-wallets from India are: State Bank buddy and ICICI Pockets. A payment gateway or PG is an intermediary organization between buyer and seller which processes and authorizes an online transaction by using banking, cards, electronic wallets and other information. Paypal and Amazon Pay are two popular payment gateways now days. Also, there are companies like Mastercard and Visa which connect with banks across the globe to issue debit/credit cards and support online transactions as a part of the payment gateways. A *cryptocurrency* is another modern-day marvel. It is a digital currency which is transacted over a decentralized and peer to peer (P2P) network using the block chain technology. Bitcoin is one such popular example of a crypto currency. Bitcoin is a type of digital currency or digital asset which investors can buy and trade. Satoshi Nakamoto, a Pseudonym person (real identity not confirmed), developed the concept of Cryptocurrency and launched 'Bitcoin' in 2009. 'Litecoin' is another example of a Cryptocurrency.

1.2 Advantages and disadvantages of electronic payments

An electronic payment system should be assessed from four different perspectives which are technological, economic, social and regulatory (Khairun & Yasmin, 2010). Customer service features such as speed of access and ease of access becomes critical for an electronic payment system. Adequate knowledge of technology among users and security of the transaction are the two areas of concern for usage of an e-payment system (Khairun & Yasmin, 2010). Being a technology driven tool, payment systems may fail and default. The organization should not over rely on electronic systems and should keep a backup plan ready. They are susceptible to attacks by hackers and other forms of online intrusions. Cost implications in an e-payment system is critical issue. Cost of establishing an electronic payments structure is huge and there are different types. Technology Infrastructure cost, arrangements and agreements costs, revenue sharing, legal litigation costs, marketing costs, training costs are some examples of associated costs. Although there are many advantages of electronic payments, there are few disadvantages such as hidden charges (Any additional and opaque charges), limited usage of selected currencies, maintenance and ownership concerns and inefficient grievance handling. Laudon and Traver (2007) highlight the advantages of electronic payment systems over the traditional methods. They encourage privacy, integrity, compatibility, good transaction efficiency, acceptability, convenience, mobility, low financial risk and anonymity. The other advantages are reaching out to customers in remote zones, minimizing on costs associated with premises leasing and security and enhancing customer awareness and loyalty (Magutu et al., 2011). Very negligible transaction time or real time transactions is another important aspect driving adoption of e-payment system. Serving huge number of users at a given point of time is another favourable feature of e-payments.

1.3 Advantages of an electronic payment systems to an economy

A homogeneous transactions system is less confusing and less ambiguous and brings all parties at par in the process ultimately creating efficiencies in the economy. Internationalization of financial transactions is imminent in times ahead and homogeneity and uniformity of the electronic payment process is a necessity. Settlement of transactions has become easy and quick.

- It saves time and other resources which can be used elsewhere in the economy.
- It is easy to identify and track misuse and frauds.
- Its involvement of private sector enables the diversity of products and services offered for electronic payments systems.
- Intermediary costs are reduced adding to the efficiencies of the parties involved.
- A new market for information technology products and services has emerged because of electronic commerce and online business.
- Government services and benefits can be easily and widely implemented.

2. Research Methodology

The objective of the research is to understand the relationship between electronic transactions and economic growth. Thus, the available data on various parameters of electronic transactions (such as number of payments cards, ATMs etc.) and Gross Development Product (GDP) have been used in the analysis. Data from randomly selected countries (convenience sampling) has been used where effort was made to select countries from different geographical areas and from different income levels. Thus, data from Saudi Arabia (Middle east, high income), United Kingdom (Europe, High Income), India (Asia, lower middle income), Malaysia (Asia, Middle income), Jordan (Middle east, upper middle income), Canada (North America, High income), United States (North America, High income) and Australia (Asia-Pacific, High income) are used in the study. The research uses basic analytical techniques of correlations and regressions for the purpose using SPSS 20.0 software. Primarily the time series data for five years (2014-2018) has been used as data availability is a concern.

3. Literature Review

The era of ICT and digital innovations has come along with a dynamic change in the world business environment, whereby business transactions are constantly shifting from cash-based transactions to electronic-based ones (Mohamad et al., 2009). The global proliferation of the internet and its rapid usage has facilitated electronic commerce to become an integral part of the global business environment. As electronic transactions grew, an electronic payment solution emerged to replace the cash-based payment systems. An electronic payment can be defined as *a platform used in making payments for goods/services purchased online through the use of internet*, (Roy & Sinha, 2014). Kaur and Pathak (2015) state that a reliable and cashless payment system offers immunity against theft of paper and e-money and that cost reduction, improved customer service, improved working capital, increased operational efficiencies and cycle times and processing efficiencies were several other benefits of e-payments. Bezhovski (2016) claims that mobile payments are to surpass card payments in future. He is caution that trust and consumers' habits are critical to this growth along with enhancing the compatibility with a wide range of users, use of latest technology and the security and privacy issues. Peter and Babatunde (2012) define e-payment system as a form of fund transfer using the internet. Another definition suggests that e-payment systems are payments made in electronic commerce environment in the form of money exchange through electronic means (Kaur & Pathak, 2015). Additionally, Kalakota and Whinston (1997), see electronic payment as a financial exchange that takes place online between the seller and the buyer. An e-payment system can also be understood as payment by electronic transfer other than payment by cheque and cash. Lin and Nguyen (2001) define an e-payment system including payments made using the automated clearing house, commercial card systems and electronic transfers. Shon and Swatman (1998) define e-payment as any exchange of funds initiated via an electronic communication channel. The emergence of e-payment systems has been resulted in the alignment of world payment system with the current trend of transactions among individuals, businesses and governments (Odi & Richard, 2013). The world payments system is gradually changing from coins and paper-based money to electronic forms (Premchand & Choudhry, 2015). E-payment systems are important mechanisms used by individual and organizations as a secured and convenient way of making payments over the internet and at the same time a gateway to technological advancement in the field of world economy (Slozko & Pello, 2015). According to Oladeji (2014) e-payments have become a major facilitating engine in e-commerce on which an electronic business success is based. Premchand and Choudhry (2015) comment that the emergence of the electronic payment system has brought efficiency, fraud reduction and innovativeness in the world payment system.

4. Data Analysis and discussion

Electronic payments are a new form of transactions with numerous advantages (such as accessibility) and few disadvantages (such as privacy). This phenomenon is here to stay and will only grow in times to come. Thus, the growth of banking and financial sector and the growth of economy will be largely dependent on the growth of electronic payments and electronic transactions. This is going to be a global phenomenon as one of the salient features of e-payments is connectedness. According to the World Payments report, 2019 (published by Capgemini), Global payments revenues increased to USD 1.9 trillion in 2017. The number of global non-cash transaction grew at 12% to reach 539 billion transactions during the year 2016-17. Among the top ten markets for non-cash transactions, the United States continued to dominate the list, followed by the Eurozone. Russia, India, and China also recorded high percentage growth in 2016-17 due to various market led and government

initiatives. The predominant use of mobile applications such as AliPay and WeChat Pay has bolstered China to perform better in this space. The Central Bank of Russia's implementation of a nationwide card system has helped its cause on online transactions and electronic payments. India also broke into top 10 league, in terms of non-cash transactions, primarily driven by growth in credit-transfers and the efforts of National Payments Corporation of India. As per this report, Norway was the number one country for per capita non-cash transactions. The 2019 Federal Reserve Payments Study for the United States found accelerating growth overall in core noncash payments during the time period 2015-2018 compared to the previous three-years (Table 1). The study also found that the Debit and credit card payments grew 8.9%, per year, between the time period (2015-2018), half of the individual card payments (2018) were chip authenticated and that the cheque payments fell 7.2 % per year from 2015-2018.

Table 1
Noncash payments

	CAGR (%) (2012-2015)		CAGR (%) (2015-2018)	
	Numbe	Value	Numbe	Value
Total	5.	3.	6.	3.
1. Cards	6.	5.	8.	8.
1a. Debit cards	6.	5.	8.	7.
i. Non-prepaid	6.	5.	8.	8.
ii. Prepaid	6.	8.	7.	5.
1b. Credit cards	7.	6.	9.	9.
2. Automated clearing house	4.	4.	6.	7.
3. Network	4.	4.	6.	7.
4. On-us	5.	4.	6.	7.
5. Checks	-	2.	-	-
6. Checks written	-	2.	-	-
7. ATM cash withdrawals	-	3.	-	1.

Source: The 2019 Federal Reserve Payments Study

Table 2
Economic and e-payments growth rates for India

	GDP	Cards	M-	M-
2017	7.17	17%	68%	86%
2016	8.17	26%	104%	12%
2015	8.00	3%	159%	224%
2014	7.41	16%	152%	290%
Averag	7.69	16%	121%	153%

Source: Reserve Bank of India

Table 2 indicates that for the time period (2014-2017) in India, the average GDP growth was 7.69% which was much less than the average growth in cards value (16%), M-wallets (121%) and m-banking (153%). This clearly indicates that the growth rate of electronic services is much ahead than the GDP growth. Analysing the correlation (Table 3), it is observed that the correlations is the highest and positive ($r=0.79$) between mobile wallets and mobile banking and positive but medium ($r=0.37$) between GDP and mobile wallets. This indicates that mobile wallets can boost an economy as well as the mobile banking business.

Table 3
Correlations for India (2014-2017)

Variables	Correlation
GDP & Mobile Banking	-0.27
GDP & Cards	0.02
GDP & Mobile wallets	0.37
Cards & Mobile wallets	-0.61
Cards & Mobile banking	-0.69
Mobile wallets and Mobile	0.79

(Source: Reserve Bank of India)

Table 4
Basic payments indicator for Malaysia

	2014	2015	2016	2017	2018
Population (million)	30.71	31.19	31.63	32.05	32.39
GDP (RM million)	11064	1,158,5	1,231,0	1,353,3	1,429,8
Cash in circulation (CIC) (RM)	68,029	76,687	85,480	92,388	94,307
E-payments transaction Value Per	563,89	549,65	550,70	613,67	668,78

Analysing Table 4 for Malaysia, it is observed that the transaction value per capita for electronic payments has increased in 2017 and 2018, although a population increase was observed during the same time period. Analysis of the 2018 red book statistics from the Bank of International Settlements (BIS) was not very encouraging. It was observed that large-denomination notes are used more than small denomination notes. Also, it was found that total cash in circulation has grown a cashless society, or even a low cash society is still elusive. Sweden was found as an exception where cash in circulation is decreasing and mobile payments booming at the expense of card payments. The number of transactions for contactless cards per inhabitant were found to be rising rapidly in both advanced and emerging market economies. Also, consumers were found to be increasingly using debit or credit cards when abroad as cross-border card payments were found to grow twice as fast as domestic payments since 2012. In advanced economies, on an average, a consumer used his/her card for overseas transactions 14 times a year, while in emerging market economies the average was found to be twice a year. This disparity indicates towards improved online business and high online transactions in emerging economies in times to come. The Payments statistics 2018, published by the European Central Bank (ECB) in July, 2019, revealed important information about e-payments in the European region and the report can be termed as encouraging from electronic payments perspective. The total number of non-cash payments in the euro area increased by 7.9% to 90.7 billion in 2018 from 2017. Card payments accounted for 46% of the total number of non-cash payments in the euro area, while credit transfers and direct debits accounted each for 23%. About 1.6 payment cards per capita were found and around 44 billion transactions were processed by retail payment systems in the euro

area with an amount of 34 trillion euros. Analysing macroeconomic data (1993-2017) for Saudi Arabia, it is observed that all the parameters (except GDP in 2015) has grown positively during the time period. The rate of growth and the relationship of GDP (economic growth) with other macroeconomic variables can be understood by measuring correlations (Table 5). It is observed that all the four variables are positively and highly correlated with GDP for Saudi Arabia indicating that an increase in electronic payment infrastructure will boost economic growth. For Saudi Arabia, high correlation coefficient between GDP growth and electronic transaction holds true for medium term and long term (see Table 5 and Table 6). Further comparative analysis of correlations of growth rate for key electronic payment usage is done (Table 6) for five different economies across the globe for the time period (2014-2018). It is observed that for Saudi Arabia (indicated with suffix S), the economic growth moves in the same direction (high and positive correlations) as electronic transactions. For the United Kingdom (indicated with suffix UK), the economic growth is negatively correlated with cards ($r=-0.55$), positive and high with POS ($r=0.65$) and ATM ($r=0.95$). For Australia (indicated with suffix A), it is observed that the economic growth has brought down the number of cards, POS and ATMs indicating increased use of online and electronic platforms for monetary transactions. For Canada (indicated with suffix C), the correlation is observed to be negative with POS ($r=-0.7$) and positive with cards and ATMs.

Table 5

Correlations amongst key variables for Saudi Arabia (1993-2017)

Variables	Correlations
GDP & Number of ATMs	0.96
GDP & Number of Cards	0.91
GDP & Number of Transactions	0.95
GDP & Number of Notes	0.94

(Source: author's calculation)

Table 6

Correlations (growth rate) of key parameters (2014-2018)

	Cards.S	POS.S	ATM.S
GDP for Saudi Arabia (GDP.S)	0.087	0.813	0.893
	Cards.UK	POS.UK	ATM.UK
GDP for United Kingdom (GDP.UK)	-0.548	0.652	0.949
	Cards.A	POS.A	ATM.A
GDP for Australia (GDP.A)	-0.583	-0.687	-0.47
	Cards.C	POS.C	ATM.C
GDP for Canada (GDP.C)	0.131	-0.694	0.228

(Source: World payments statistics,2019)

Extending the analysis to regression analysis with GDP growth rate as the dependent variable and other variables as independent variables (individually), bivariate regression was conducted for the four countries. None of the regressions were found significant for Saudi Arabia, Canada and Australia. For UK, GDP was found to be significant with number of ATMs (p -value=0.05, R-squared=90%). The correlation between cash in circulation and GDP (local currency,2004-2019) for Jordan was found at 0.98 indicating that cash also has a positive effect on GDP growth. The regression analysis for the same indicated a significant (p -value = 0) R-squared value as 96%. This correlation falls to 0.93 in short term (2014-2018) indicating a decreasing dependency (R-squared=86%, p -value=0.02) of GDP on cash in circulation.

5. Conclusion

The objective of this paper on electronic payments was to understand more about its relationship with economic growth by analysing relevant data across the globe. Overall, no finding can be generalized across the globe. There are country specific factors which operate in this relationship such as negative correlation ($r=-0.7$) between POS terminals and GDP growth for Australia and Canada but positive for UK and Saudi Arabia. For Saudi Arabia, high correlation coefficient between GDP growth and electronic transaction holds true for medium term and long term but for Jordan this relationship weakens in short term. Thus, one managerial implication of the research is that for policy making on electronic transactions, country specific factors should be given more weight over international factors. It was also observed found that non cash transactions are increasing across the globe with United States leading the list followed by European countries and few Asian giants (Russia, China, India). Card payments were found to be the biggest contributor to the electronic payments in Europe. Analysing the interactions between economic growth (GDP) and non- cash transactions, contrary results were observed as the correlations were found to be low and negative for India while being high and positive for Saudi Arabia. It can be concluded that as an economy grows from developing stage to developed economy, non-cash transactions and usage of electronic payments will also grow. Thus, it can be concluded that electronic payments along with other forms of online transactions have good prospects in times to come, particularly in emerging economies like India. Also, it was found that electronic payments were global phenomenon and considering its advantages, it becomes a necessity for every government, corporate and individual. The advantages of electronic payments were discussed and its mutually helpful interaction with the economy was found along with value addition to individual customers in terms of numerous benefits (access, speed, convenience etc.). Also, the downside of electronic payments such as frauds, misuse and high dependence on technology was discussed which should be considered by policy makers and corporates. These findings will serve a useful literature resource for academic and policy discussions on electronic transactions in general and electronic payments, specifically.

5.1 Limitation

The required data is published late and is not easily available. Thus, very recent data could not be considered in the study. Randomly selected countries were used as sample in the study which can be extended in further studies for a more comprehensive analysis.

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